Shorter Contributions

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New Records of the Eastern Spotted Skunk in Northwestern Virginia

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The Eastern Spotted Skunk (*Spilogale putorius*) is a small carnivore that has declined across much of its geographic range, especially in the central-southern Appalachian Mountains (Gompper & Hackett, 2005; Campbell et al., 2010). This species is considered vulnerable in Tennessee and North Carolina (Chapman, 2007) and a species of moderate conservation need in Virginia (M. Fies, Virginia Department of Game and Inland Fisheries, pers. comm). In Virginia, the assumed range of the Eastern Spotted Skunk is confined to the western mountain (Linzey, 1978) and western Piedmont regions of the state (M. Fies, unpub. data). As of 2015, only thirteen counties in Virginia (Alleghany, Augusta, Bath, Frederick, Giles, Grayson, Highland, Lee, Page, Rappahannock, Roanoke, Shenandoah, and Wythe) have published records of Eastern Spotted Skunks (Handley & Patton, 1947; Campbell et al., 2010; Diggins et al., 2015; Fig. 1). Unpublished records, however, have been confirmed in at least 24 counties from photographic evidence submitted to the Department of Game and Inland Fisheries during the past 20 years (M. Fies, unpub. data).

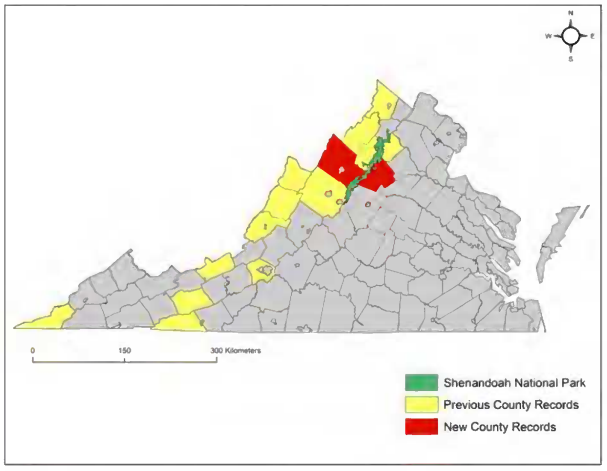

Fig. 1. Map of previously published county records (Alleghany, Augusta, Bath, Frederick, Giles, Grayson, Highland, Lee, Page, Rappahannock, Roanoke, Shenandoah, and Wythe) and new county records (Green, Madison, and Rockingham) of Eastern Spotted Skunk (*Spilogale putorius*) in Virginia.

From May to October 2015, we conducted an 18-week camera survey at 48 sites in Shenandoah National Park, ranging from the vicinity of Signal Knob Overlook (milepost 5.5) in the north to sites near Simmons Gap Ranger Station (milepost 73) in the southern portion of the Park. Our goal was to determine the presence of Allegheny Woodrats (*Neotoma magister*), Least Weasels (*Mustela nivalis*), Long-tailed Weasels (*Mustela frenata*), Fishers (*Martes pennanti*), and Eastern Spotted Skunks. Sites were located in rock outcrops and other rocky areas such as talus slopes, cliffs, cliff lines, boulder fields, and steep drainages. Typical rock outcrops were at least 10 m wide and protruded at least 0.5 m from the ground surface. We grouped sites into six clusters of 7-9 sites because distances between sites varied greatly (200-1700 m, mean = 1180 m). We conducted three 6-week survey sessions (i.e., late spring, summer, and late summer/ early fall), where each cluster was sampled for seven days per survey session and site rotation was kept constant across all sessions.

We deployed two Moultrie M-880 8.0 megapixel Trail Cameras (Moultrie Inc., Alabaster, AL) 50-75 m apart at each site. When triggered, each camera took a burst of three photographs over seven seconds, which can maximize the probability of a successful detection (De Bondi et al., 2010). Due to the vertical nature of some rocky areas, we attached and secured cameras to trees at varying heights (0.25-1.5 m) depending on the rock outcrop structure. Five days prior to sampling, we placed Gusto® long-distance call lure (Caven's, Minnesota Trap Line Products, Pennock, MN) on a tree above each baited set or on the ground because the lure is known to be attractive to a wide range of carnivores (Moen et al., 2012). We placed a brown PVC tube (35.5 cm x 10 cm x 12 cm) closed at one end in front of each camera because weasels and spotted skunks are known to investigate burrows up to 30 cm deep (Frank & Lips, 1989).

Inside each tube, we placed raw meat or sardines fastened down with a 9-gauge galvanized utility wire secured to the outside of the tube. We quantified capture success as the number of trap events (i.e., photographs) per 100 trap nights multiplied by 100.

During 1,985 trap nights, we acquired >61,000 photographs of 16 mammalian and nine avian species. Eastern Spotted Skunks were detected nine times (capture success = 0.4534) at seven sites throughout the Park. Four of those sites were located in Greene, Madison, and Rockingham counties, which are the first published records of this species in all three counties. Confirmed but unpublished records previously existed for Madison and Rockingham counties (M. Fies, unpub. data). The three remaining sites were located in Rappahannock County.

The Rockingham County record was obtained on 8 August at 2109 h in a rock outcrop located in a drainage along Skyline Drive just south of Beldor Run Overlook (elevation 709 m) near milepost 71. Based on its unique pelage pattern, we were able to determine this individual was detected at the same location on 21 September at 0253 h. The habitat consisted of a closed canopy mixed oak-hickory forest. The Madison County record was obtained on 11 September at 0438 h along a trail that cuts across a talus slope on Hawksbill Mountain (elevation 1113 m). All Spotted Skunks recorded in Greene County were found on Hightop Mountain. The first one was photographed on 21 September at 0234 h at the summit (elevation 1074 m) on an exposed talus slope below a cliff face. Another individual was detected twice at a lower elevation (850 m) in closed-canopy oak-hickory forest (24 September at 2137 h and 25 September at 0554 h; Fig. 2).

The first detection in Rappahannock County occurred on 27 July at 0205 h in a rock outcrop located in a closed-canopy oak (*Quercus* spp.)-hickory (*Carya* spp.) forest (elevation 745 m) along Skyline Drive near Indian Run Overlook near milepost 10.5. The second detection occurred on 26 August at 0439 h on a ridge in a partially open canopy oak-hickory forest (elevation 833 m) northeast of Rangeview Overlook near milepost 16. The last detection in Rappahannock County occurred at 2211 h on 27 August at the edge of an oak-hickory forest at the bottom of a boulder field directly below the Mt. Marshall Overlook along Skyline Drive (elevation 869 m).

Of the seven sites where we detected Eastern Spotted Skunks, two (Madison and Greene counties) were located on talus slopes with little to no canopy cover. Although this species is known to inhabit rock outcrops (Diggins et al., 2015), they are believed to avoid areas with an open canopy to avoid predation by Great Horned Owls (*Bubo virginianus*) (Lesmeister et al., 2009). Our use of a scent-lure might explain why these individuals were detected on talus slopes. Our capture success was comparable to that reported by Hackett et al. (2007) using live traps, but lower than what was reported using cameras or track plates in Arkansas. However, as compared to an incidental live trap study in Grayson County, Virginia, our capture success was 2.3 times less (Diggins et al., 2015).

Fig. 2. Eastern Spotted Skunk (*Spilogale putorius*) in rock outcrop on Hightop Mountain on 25 September 2015 in the southern district of Shenandoah National Park, Greene County, Virginia.

Distribution of the Eastern Spotted Skunk is poorly known across the central-southern Appalachian Mountains. Our research contributes new information about the distribution of Eastern Spotted Skunks in northwestern Virginia. Despite low capture success in this study, high capture success in Missouri and Arkansas (Hackett et al., 2007) demonstrates the effectiveness of cameras in documenting the presence of Eastern Spotted Skunks.

ACKNOWLEDGEMENTS

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An Instance of Geophagy by Pileated Woodpecker (*Dryocopus pileatus*) in the Great Dismal Swamp

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Avian geophagy can serve several functions (Ziswiler & Farner, 1972; Diamond et al., 1999; Gilardi et al., 1999; Gionfriddo & Best, 1999). Coarser particles and grit aid in the trituration or grinding of food in the gizzard, whereas finer particles (< 63 µm) may provide minerals and act to buffer toxic or bitter compounds in the diet. Most granivorous and herbivorous birds, as well as many insectivorous species, are believed to ingest grit (Ziswiler & Farner, 1972). However, the checklist of avian families and species for which geophagy or grit consumption has been documented is surprisingly limited (see Gionfriddo & Best, 1999). Of interest here is the absence of reported geophagy or grit consumption among the dozens of papers that have addressed the diet of Pileated Woodpecker (*Dryocopus pileatus*) across its vast North American range (Bent, 1939; Bull & Jackson, 2011).

On 24 May 2001, I observed a Pileated Woodpecker on Lynn Ditch Road (36° 42.4' N; 76° 31.6' W) about 1.0 km south of Jericho Ditch Lane, in the Great Dismal Swamp National Wildlife Refuge (GDSNWR), City of Suffolk, Virginia. The woodpecker was vigorously pecking the sandy soil exposed in the parallel tire tracks atop the road, which is the only dry soil in this sector of the swamp in spring (Graves, 2001). I watched the bird through 10 × 40 binoculars from a distance of 40 m for about a minute until it flew. The woodpecker made swallowing motions several times but I could not tell